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ART UNIT	**PAPER NUMBER**
2827	

DATE MAILED: 12/31/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/881,151	ERIK PAULSEN	
	Examiner	Art Unit	
	Thanh Y. Tran	2827	

-- The MAILING DATE of this communication appears on the cover sh et with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *03 October 2003*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-25* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-25* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *10 October 2003* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Specification

1. The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required: for example, it fails to provide description of "an electrical connection", and "a major plane" in claim 7; and "electrical connections", "major plane", "minor plane" as recited in claim 14.

Drawings

2. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, "first set of contacts", "second set of contacts" as recited in claims 1, 6, 15, 17 and 20-22; "an electrical connection", "a major plane" as recited in claim 7; "third set of contacts", "fourth sets of contact" as recited in claim 13; "electrical connections", "major plane", and "minor plane" as recited in claim 14 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claims 1-25 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Applicant's specification fails to teach the limitation of "an electrical connection within the converter board extends two dimensionally within a major plane of extension of the converter board, the major plane of extension of the converter board being substantially parallel to major planes of extension of the circuit board and the integrated circuit" (emphasis added) as recited in claim 7.

The original specification only teaches third single contact and fourth single contact, example: third contact 334 and fourth contact 336. There is no place in the specification teaching third set of contacts and fourth set of contacts or a plurality of third or fourth contacts as recited in claim 13.

Applicant's specification fails to teach the limitation of "the electrical connections extend two dimensionally in a major plane of extension of the converter device and extend two dimensionally in a minor plane of extension perpendicular to the major plane of extension of the converter device"(emphasis added) as recited in claim 14.

Applicant's specification fails to teach the limitation of "the first set of contacts being communicatively coupled to the second set of contacts utilizing an intermediate set of contacts, wherein the first set of contacts, the second set of contacts, and the intermediate set of contacts include solder balls" (emphasis added) as recited in claim 20.

Applicant's specification fails to provide support for the limitation of "the first set of contacts being communicatively coupled to the second set of contacts through an intermediate set of contacts, wherein each of the first set of contacts, the second set of contacts, and the intermediate set of contacts include spherical contacts" as recited in newly added claims 21 and 22.

Applicant's specification fails to provide support for the limitation of "a first round contact", "second round contact", "third round contact", "fourth round contact", "third converter board in physical and electrical contact with the third round contact; a fourth round contact in physical and electrical contact with the third converter board; a circuit board in physical and electrical contact with the fourth round contact", and "wherein the ball grid array integrated circuit and the circuit board sandwich the first, second, third and fourth round contacts and the first, second, and third converter boards" as recited in newly added claim 23.

Applicant's specification fails to provide support for the limitation of "the converter device formed of having interior layers in physical contact in the following order: first dielectric, a ground plane, second dielectric, signal, third dielectric, power, fourth dielectric, ground, and fifth dielectric" as recited in newly added claim 24.

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 1-20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 is unclear, what Applicant means by "first set of contacts" and "second set of contacts"? Since the drawings of the invention only show first single contact 324 and second single contact 326.

Claim 7 is unclear as to what Applicant means by "an electrical connection within the converter board extends **two dimensionally** within a major plane of extension of the converter board, the major plane of extension of the converter device being substantially parallel to major planes of extension of the circuit device and the integrated circuit"? (emphasis added).

Claim 13 is unclear as to what Applicant means by "a third set of contacts, and a fourth set of contacts, the third and fourth sets of contacts being arranged on opposing sides of the third converter board"? The examiner does not see how the third and fourth sets of contacts being arranged on opposing sides of the third converter board.

Claim 14 is unclear as to what Applicant means by "wherein the electrical connections extend **two dimensionally** in a major plane of extension of the converter device and extend **two dimensionally** in a minor plane of extension perpendicular to the major plane of extension of the converter device"? (emphasis added).

Claim 20 is unclear as to what Applicant means by "the first set of contacts being communicatively coupled to the second set of contacts utilizing an intermediate set of contacts, wherein the first set of contacts, the second set of contacts, and the intermediate set of contacts include solder balls"? (emphasis added). The Examiner only see the second set of contact 326 (as shown in figure 3F) is a solder ball. First set of contact 324 (as shown in figure 3F) is not a solder ball.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. Claims 1-19 and 23-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gedney et al (U.S. 5,483,421).

With respect claim 1, Gedney et al discloses a device (Fig. 5), comprising: a board (24) having a first side and a second side in a parallel relationship, the first and second sides being separated from each other by a thickness of the board (24), the board further having third through sixth sides (frond, rear, left, and right sides) that are parallel to the thickness of the board (24), the third (front side) and fifth sides (rear side) being parallel to each other, the fourth and sixth sides (left and right sides) being parallel to each other, and the third (front) and fourth (left) sides being orthogonal to each other, wherein the first side includes a first set of contacts (30) suitable for electrically contacting an integrated circuit (20) having a first configuration; and the second side includes a second set of contacts (32) suitable for electrically contacting a circuit board (38) having a second configuration, wherein the second set of contacts (32) are communicatively coupled to the first set of contacts (see element 35); the board (24) being defined by a z axis, a y axis, and an x axis, in which the x, y, and z axes are mutually orthogonal, the z axis being orthogonal to the first and second sides (top and bottom sides) and corresponding to the thickness of the board (24), the x axis being parallel to the third and fifth sides, the y axis being

parallel to the fourth and six sides, wherein at least one of the first set of contacts (30) is electrically connected to a corresponding one of the second set of contacts (32) such that these two contacts have a non-zero x offset, and a non-zero z offset with respect to each other, wherein contacts (30) having a function configured in the first configuration are not arranged with contacts (32) having a corresponding function configured in the second configuration, and wherein the set of contacts (30) of the first configuration and the second configuration have a *substantially* similar size (see figure 5, contacts 30 and contacts 32 have *substantially* similar sizes). [It should be noted that: since the third contact (third pad 30) on the first side of the board is communicatively coupled to the second contact (second pad 32) on the second side of the board, it is considered that the contacts (pad 30) having a function configured in the first configuration are not arranged with contacts (pads 32) having a corresponding function configured in the second configuration].

Gedney et al does not clearly teach the at least one of the first set of contacts is electrically connected to a corresponding one of the second set of contacts such that these two contacts have a non-zero y offset. Since figure 5 of Gedney et al discloses at least one of the first set of contacts (30) is electrically connected to a corresponding one of the second set of contacts (32) such that these two contacts have a non-zero x offset, and a non-zero z offset with respect to each other. Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to also provide another one of non-zero offset direction such as a non-zero y offset for connecting between the first set of contacts and a corresponding one of the second set of contacts, because such providing a connection having a non-zero y offset would

improve the connection technology for the packaging involves the interconnected configurations of circuit boards.

With respect to claims 2 and 9, Gedney et al discloses a device (Fig. 5), wherein a device (24) having the first configuration is unsuitable for direct contact and operation with a device (24) having the second configuration.

With respect to claim 3, Gedney et al discloses a device (Fig. 5) comprising an integrated circuit (20) having a set of contacts (36) arranged in the first configuration and a circuit board (38) having a set of contacts (44) arranged in the second configuration.

With respect to claim 4, Gedney et al discloses a device (Fig. 5) wherein the integrated circuit set of contacts (36) includes at least one contact having a function corresponding to a function of a contact (44) of the circuit board (38), the integrated circuit contact (36) positioned so that when the integrated circuit (20) is arranged with the circuit board (38), the integrated circuit contact (36) is not positioned for electrical coupling to the contact of the circuit board (38) having a corresponding function.

With respect claim 5, Gedney et al discloses a device (Fig. 5) wherein the board includes a ground layer and a power layer (see col. 1, lines 13-21 and col. 6, lines 32-40). It should be noted that: since the boards provide the various power and ground I/O signal lines to the integrated chips, it is known that the boards including a ground layer (ground signal line) and a power layer (power signal line).

With respect to claim 6, Gedney et al discloses a device (Fig. 5) wherein the first set of contacts (30) is electrically connected over an electrical connection (see elements 34 or 35) to the second set of contacts (32).

With respect to claim 7, as best understood, Gedney et al discloses an apparatus (Fig. 5), comprising: an integrated circuit (20) including a set of contacts (36), wherein the integrated circuit set of contacts (36) is suitable for operation in a first configuration, the first configuration having an arrangement of contacts (36) and corresponding functions of arranged integrated circuit contacts (36); a circuit board (38) including a set of contacts (30), wherein the circuit board set of contacts (30) is suitable for operation in a second configuration, the second configuration having an arrangement of contacts (30) and corresponding functions of arranged circuit board contacts (30), wherein the contacts (30) of the second configuration are situated to correspond to the contacts (36) of the first configuration of the integrated circuit (20), and arrangement of functions of the contacts (30) of the second configuration does not correspond to arrangement of functions of the contacts (36) of the first configuration [it should be noted that: since the second and fifth contacts (36) of the first configuration are not coupled to the second and fifth contacts (30) of the second configuration, it is considered that arrangement of functions of the contacts (30) of the second configuration does not correspond to arrangement of functions of the contacts (36) of the first configuration]; and a converter device (24) disposed between the integrated circuit (20) and the circuit board (38), wherein the converter device (24) includes a first set of contacts (30) suitable for contacting the integrated circuit (20) having the first configuration, and a second set of contacts (32) suitable for contacting the circuit board (38) having the second configuration, wherein the first set of contacts (30) is communicatively coupled to the second set of contacts (32) (see elements 34 and 35) and wherein contacts (30) having a function configured in the first configuration are not arranged with contacts (32) having a corresponding function configured in the second configuration [it should be noted that: since

the third contact (pad 30) is coupled to the second contact (second pad 32), not the third pad 32, it is considered that contacts having a function configured in the first configuration are not arranged with contacts having a corresponding function configured in the second configuration], wherein an electrical connection (34 or 35) within the converter device (24), the electrical connection electrically connecting at least one of the first set of contacts (30) with at least one of the second set of contacts (32).

With respect to claim 8, Gedney et al discloses a device (Fig. 5) wherein contacts (36) of the integrated circuit (20) having a function configured in the first configuration are not arranged with contacts (44) of the circuit board (44) having a corresponding function configured in the second configuration.

With respect to claim 10, Gedney et al discloses a device (Fig. 5) wherein the first set of contacts (30) is disposed to the second set of contacts (32) as at least one of opposing sides of the device (24) and sharing a side of the device (24).

Claim 11 recites limitations similar to claim 4. Therefore, it is rejected for the same reasons.

With respect to claim 12, Gedney et al discloses a device (Fig. 5) wherein the device (24) includes a first board (26) and a second board (as labeled in figure 5).

With respect to claim 13, as best understood by examiner, Gedney et al discloses an apparatus (Fig. 5) further comprising a third board (28), wherein the first board (26) includes the first set of contacts (30) and the third board (see "second board" as labeled in figure 5) includes the second set of contacts, wherein the first set of contacts (30) being communicatively coupled

to the second set of contacts (32) through the first converter board (26), the third converter board (28), and the second converter board.

With respect to claim 14, as best understood, Gedney et al discloses an apparatus (Fig. 5), comprising: an integrated circuit (20) including a set of contacts (36), wherein the integrated circuit set of contacts (36) is suitable for operation in a first configuration, the first configuration having an arrangement of contacts (36) and corresponding functions of arranged integrated circuit contacts (36); a circuit board (38) including a set of contacts (44), wherein the circuit board set of contacts (44) is suitable for operation in a second configuration, the second configuration having an arrangement of contacts (44) and corresponding functions of arranged circuit board contacts (44), wherein the contacts (44) of the second configuration are situated to correspond to the contact (36) of the first configuration of the integrated circuit (20), and arrangement of functions of the contacts (44) of the second configuration does not correspond to arrangement of functions of the contacts (36) of the first configuration; and a device (24) disposed between the integrated circuit (20) and the circuit board (38), wherein the device (24) includes a first set of contacts (30) suitable for contacting the integrated circuit (20) having the first configuration and a second set of contacts (32) suitable for contacting the circuit board (38) having the second configuration, the first set of contacts (30) electrically coupled to the second set of contacts (32) via electrical connections (see elements 34, 35), wherein contacts (30) having a function configured in the first configuration are not arranged with contacts (32) having a corresponding function configured in the second configuration [it should be noted that: since the third contact (third pad 30) on the first side of the board (24) is communicatively coupled to the second contact (second pad 32) on the second side of the board (24), it is considered that the

contacts (pad 30) having a function configured in the first configuration are not arranged with contacts (pads 32) having a corresponding function configured in the second configuration].

With respect to claim 15, figure 5 of Gedney et al shows an integrated circuit (20) configured for contacting the first set of contacts (30) of the device (24) includes at least one contact (30) positioned so as to be unsuitable for direct contact and operation with the circuit board (38).

Claim 16 recites limitations similar to claim 2. Therefore, it is rejected for the same reasons.

Claim 17 recites limitations similar to claim 10. Therefore, it is rejected for the same reasons.

Claim 18 recites limitations similar to claim 1. Therefore, it is rejected for the same reasons.

Claim 19 recites limitations similar to claim 12. Therefore, it is rejected for the same reasons.

With respect to claim 23, as best understood by examiner, claim 23 recites limitations similar to claims 7-8 and 12-13. Therefore, it is rejected for the same reasons.

Claim 24, as best understood, it recites limitations similar to claim 14. Therefore, it is rejected for the same reasons.

With respect to claim 25, as best understood by examiner, Gedney et al does not teach the thickness of the converter device (converter board). It would have been obvious to a person having ordinary skill in the art at the time the invention was made to modify the device/board of Gedney et al by providing a specific thickness for each layer of the board, since it has been held

that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or working ranges involves only routine skill in the art. In re Aller, 105 USPQ 233.

9. Claims 20-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gedney et al (U.S. 5,483,421) in view of Yew et al (U.S. 6,218,202).

With respect to claim 20, as best understood, Gedney et al discloses an apparatus (Fig. 5), wherein the first board (26) includes the first set of contacts (30). Gedney et al does not teach a second board includes the second set of contacts, wherein the second set of contacts include solder balls. Yew et al discloses a device (figure 7) comprising a first board (see element 101) having first contacts, and a second board (see element 102) having second contacts, wherein the first contacts and second contacts are communicatively coupled by an intermediate contacts which include solder balls. Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to modify the apparatus of Gedney et al by including solder balls or contacts round in cross section or spherical contacts for electrically coupling the first contacts to the second contacts of the first and second boards.

With respect to claims 21 and 22, as best understood by examiner, they recite limitations similar to claim 20. Therefore, they are rejected for the same reasons.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thanh Y. Tran whose telephone number is (703) 305-4757. The examiner can normally be reached on Monday through Thursday and on alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kamand Cuneo, can be reached on (703) 308-1233. The fax phone number for the organization where this application or proceeding is assigned is (703) 305-3431.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

TYT